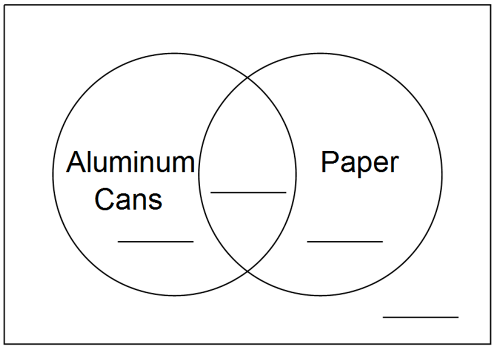
SM2H

Name:____________________________ Period:________

## 10.4 Probability from Venn Diagrams and Two-Way Tables

1. In one community, 300 people were surveyed to see if they would participate in a curbside recycling program. Of those surveyed, 134 said they would recycle aluminum cans, and 108 said they would recycle paper. Of those, 62 said they would recycle both.
   a) Fill in the missing numbers on the Venn Diagram.

   b) What is the probability that a randomly selected member of the community would recycle aluminum cans or paper?



   c) What is the probability that a randomly selected member of the community would recycle neither aluminum cans nor paper?

   d) What is the probability that a randomly selected member of the community would recycle aluminum cans but not paper?

2. The table below shows the eye color of several students. Fill in the table, then find the following:

| | **Brown** | **Blue** | **Other** | **Total** |
|---|---|---|---|---|
| **Male** | 12 | 8 | 4 | |
| **Female** | 18 | 12 | 6 | |
| **Total** | | | | |

a) $P(\text{male})$ b) $P(\text{brown})$ c) $P(\text{male} \cap \text{brown})$

d) $P(\text{female} \cup \text{blue})$ e) $P(\text{female} \cap \text{not blue})$ f) $P(\text{neither female nor blue})$

3. A department store employs 28 high school students, all juniors and seniors. Six of the 12 seniors are females and 12 of the 16 juniors are males. One student employee is chosen at random. Fill in the two-way table and find the following probabilities:
   a) $P(\text{senior})$

   b) $P(\text{male})$

   c) $P(\text{senior} \cup \text{female})$

   d) $P(\text{junior} \cap \text{male})$

| | **Junior** | **Senior** | **Total** |
|---|---|---|---|
| **Male** | | | |
| **Female** | | | |
| **Total** | | | |

4. The table shows the lunch choices of several students. Fill in the table and find the following probabilities. Express your answers as simplified fractions.

| | **Pizza** | **Salad** | **Total** |
|---|---|---|---|
| **Dessert** | 47 | 25 | |
| **No Dessert** | 34 | 64 | |
| **Total** | | | |

a) $P(\text{dessert} \cap \text{pizza})$

b) $P(\text{dessert} \cup \text{pizza})$

c) $P(\text{dessert} \cap \text{salad})$

d) $P(\text{dessert} \cup \text{salad})$

e) $P(\text{no dessert} \cap \text{pizza})$

f) $P(\text{no dessert} \cup \text{pizza})$

g) $P(\text{no dessert} \cap \text{salad})$

h) $P(\text{no dessert} \cup \text{salad})$

i) $P(\text{dessert} \mid \text{pizza})$

j) $P(\text{pizza} \mid \text{dessert})$

k) $P(\text{no dessert} \mid \text{pizza})$

l) $P(\text{salad} \mid \text{dessert})$

m) $P(\text{dessert} \mid \text{salad})$

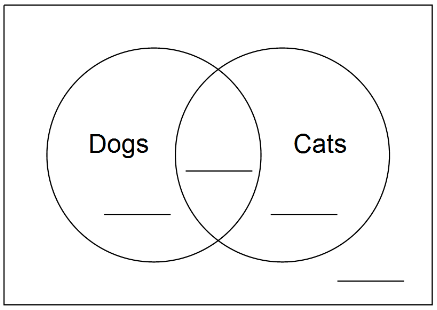
n) $P(\text{pizza} \mid \text{no dessert})$

o) $P(\text{no dessert} \mid \text{salad})$

p) $P(\text{salad} \mid \text{no dessert})$

5. Surveys show that about 48% of American households have at least one dog and 38% of households own at least one cat. About 32% of households own both. Answer the following questions. Express your answers as percentages.

a) Fill in the missing numbers on the Venn Diagram.



b) Find $P(\text{dog} \cap \text{cat})^C$

c) $P(\text{dog} \cup \text{cat})$

d) Find $P(\text{dog} \mid \text{cat})$

e) Find $P(\text{cat} \mid \text{dog})$

f) Find $P(\text{no dog} \mid \text{cat})$

g) Find $P(\text{no cat} \mid \text{dog})$

h) Find $P(\text{cat} \mid \text{no dog})$

i) Find $P(\text{dog} \mid \text{no cat})$

j) Find $P(\text{no cat} \mid \text{no dog})$

k) Find $P(\text{no dog} \mid \text{no cat})$

6. The table shows the initial choice of major of students entering college. Fill in the table Express all probabilities as decimals rounded to the nearest thousandth.

| | **Natural/ Physical Sciences** | **Business** | **Social Sciences** | **Engineering/ Computer Science** | **Humanities/ Other** | **Undecided** | **Total** |
|---|---|---|---|---|---|---|---|
| **Female** | 13482 | 8271 | 10160 | 4038 | 9509 | 19604 | |
| **Male** | 9206 | 8086 | 6033 | 16545 | 5474 | 16856 | |
| **Total** | | | | | | | |

a) What is the probability that an incoming student will major in business?

b) What is the probability that an incoming male student will major in a natural or physical science?

c) What is the probability that an incoming engineering or computer science student will be a female?

d) What is the probability that an incoming student will major in social sciences or humanities?

e) What is the probability that an incoming student will be a female who has not chosen a major?

f) What is the probability that an incoming male student will choose not to major in social sciences or business?

g) Is the probability of majoring in business given that a student is female the same as the probability that a student is female given that the student is majoring in business? Justify your answer.